CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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1. 25X1
it is expected that a total of 820,600 DME will be placed at the disposal of the Institute for Nuclear Physics (Institut fuer Kernphysik), Miersdorf, for the year 1955.[1]

2.

3. The annual report on the work of the Miersdorf Institute 25X1

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" 1. Work carried out in the tasks department.

1. Work for the Research and Technique Plan.

The work of the Institute has been divided into four departments:-

Acceleration Department

Corpuscular Physics Department ("Korpuskularphysik")

Cosmic Ray Department

Theoretical Department.

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(NOTE: Washington distribution indicated by "X"; Field distribution by "#".)

ii. Acceleration Department

The 2 MV cascade generator is ready but has not been brought into use, as the machine housing, in which the transformer for feeding the generator is to be installed, has not yet been completed. Several difficulties were encountered in the construction of the acceleration tubes of the generator, which derive from the fact that the construction, from a vacuum technical and mechanical point of view, is unsatisfactory. Several necessary alterations were carried out in the workshops of the Institute. The following research projects were carried out in this department:-

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Development of ion sources and receivers for the acceleration tubes of the high tension generator.

Two different types of source were developed. In the one, ionization resulted from electron impulse, whereby the electrons were produced from an incandescent cathode. To increase the ionization yield, ionization took place in a magnetic field, in which the electrons set up an oscillating norm. The ion source so developed gave off an ion current of about 6 mA. The development is so far advanced that on the basis of these results similar ion sources are being built, one for Miersdorf and one for the generator at Buch.[3] In the second type of ion source, the production of ions is achieved by high frequency discharge without electrons. Theoretical discussions on this source in relation to the ion extraction from plasma lead to the design of an improved extraction system. Such a system was built and tested, and the first attempts gave very satisfactory results. A receiver with a beryllium target for the production of neutrons was completed. It allows for a load of 3 to 4 mA at 2 to 3 MV acceleration tension. A rotary receiver also with a beryllium target was designed, which allows for a load of 16 kW when the size of the Brennfleck (literally, a burning spot) is 2 ccs. It is to be built if the experiments prove that an ion current of up to 8 mA can be achieved in the acceleration tubes in relation to the construction data of the generator.

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Production of radioactive isotopes.

As the 2 MV generator is not yet working, radioactive isotopes could not be produced.

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Velocity analyzer for ionic currents.

The design of an analyzer was developed for:

a) the analysis of the ionic current produced in the high-tension generator;
b) the production of a homogeneous ion current of a particular velocity;
c) the stabilization of the generator voltage.

It will only be built after the high-tension generator has been brought into use and its performance studied.

iii. Corpuscular Physics Department.

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Investigations into the thermodiffusion of liquid solutions.

Part of the investigations which had previously been carried out were finished and the results published in the "Zeitschrift für Physikalische-Chemie". In connection with this work, preliminary experiments on the application of thermodiffusion of liquids to isotope separation were begun.

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Extraction of Heavy Water.

The original development work, undertaken by the VEB Projektierung-und Anlagenbau - Buero fuer zentrale Verfahrenstechnik G 1, Dresden, was not satisfactory; work on this project is being undertaken by the Institute itself.

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Elastic and inelastic dispersion of electrons on matter.

An electron spectrograph for the velocity analysis of medium fast electrons (6 to 8 kV) was completed and is being adjusted at the present time. A considerable delay in the completion of the spectrograph is due to the fact that the Armco iron which was used for the production of the magnet appears to be very inhomogeneous and shows strong internal distortion (Verspannung). Consequently the production of a homogeneous field between the pole tips of the magnet was only possible with the greatest difficulty and by placing "Chints" (sic) between them, and the 2% homogeneity obtained was not sufficient to attain maximum resolution.

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Investigations of evaporation layers (Aufdampfschichten) by electron diffraction.

Electronic diffraction equipment has almost been completed by the workshop. There has been considerable delay because of the difficulties in obtaining raw materials; a brass cylinder of the required quality could only be obtained after many months of effort. In addition, high-tension equipment from the VEB Transformatoren - und Roentgenwerk Dresden was delivered without regulators and measuring equipment (Regel- und Messeinrichtung), thus negating its utilization.

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Investigation into the concentration of stable isotopes.

There were thorough discussions about the building of an electromagnetic isotope separator which would have a separating output of 10-5 g/hour. The construction of this apparatus will be started shortly. Some of the necessary materials, as for example iron for the magnet, have already been ordered. The building of a thermodiffusion plant for liquids for the purpose of separating isotopes has been finished. Preliminary experiments are being carried out in connection with research project. F 4-1. An ion source for the isotope separator, which is to produce an intensive ionic current so that ionization takes place without the use of a magnetic field, is almost finished in the workshops and will shortly be tested. Delays in the production of an ion source result from the very complicated soldering which can only be done in a soldering oven; such an oven was not available and had to be built.

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Investigation of surface phenomena by use of radioactive isotopes.

This research project could not be started as the required radioactive isotopes are not yet available.

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Determination of the decomposition scheme of artifical radioactive isotopes.

Work on this task has been broken off as the worker in charge of it left the Institute and, in addition, such a subject is out of line with the latest view of the development of the Institute.

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Construction of a mass spectrometer and measurement of the relative isotope frequencies.

A mass spectrometer with a special magnetic sector field, which effects double directional focussing of the ions, was completed. Considerable difficulties accompanied the obtaining of raw materials, for example vacuum smelted copper tubes for the vacuum chamber, as well as very homogeneous Armco iron for the production of magnets. The construction of a high-tension mass spectrometer is almost completed and will be tested very shortly.

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Construction and development of special measuring and recording equipment for corpuscular rays.

The construction of two ionization chambers has been started. One is for the measurement of fast neutrons and the other is for the measurement of

gamma-rays. Both chambers are primarily for dosimetric use, to protect workers from rays when the 2 MV generator is in use.

iv. Cosmic Ray Department.

[redacted] Investigation of cosmic rays by use of nuclear tracer emulsions. 25X1

Work on this project has been gone according to plan. Investigations covered:

1. the characteristics of flash-releasing materials (sternausloesenden Komponente);

2. flashes in light and heavy materials on mountain tops;

3. determination of diffusion constants of AGFA K 2 plates;

4. emulsion techniques.

There are no current difficulties except for a slight delay in the delivery of the special microscope from Zeiss.

[redacted] Development and construction of a cloud chamber. 25X1

Preparations for using a cloud chamber for investigations into cosmic rays were carried out. The diffusion cloud chamber, which had been developed at Leipzig University, was rebuilt and completed. The diffusion cloud chamber, taken over from Leipzig, was used to investigate phenomena of trace formations. The results will be published shortly.

e. Theoretical Department.

This department was established in the course of the past year. Several special problems of neutron retardation (Neutronenbremsung) were started in the theoretical stages, with reference to the measurements to be carried out later. For the same reason the problem of coulomb stimulation (Coulomb-Anregung) of nucleii was studied thoroughly. The research project F 4 - 15, Radiochemistry, could not therefore be started, especially since radioactive isotopes are not yet available."

1. [redacted] Comment: Confirmation of the amount allotted depends on the approval of the East German budget. It seems certain that the allotted sum will be substantially greater than the 681,400 DME spent last year by the Institute. 25X1

2. [redacted] Comment: It is not clear whether Dreyer's wife will accompany him. 25X1

3. [redacted] Comment: Probably the Academy Institute for Medicine and Biology, Berlin-Buch.

[redacted] 25X1